BISS Biodiversity Information Science and Standards

Biodiversity Information Science and Standards 2: e26288
doi: 10.3897/biss.2.26288

OPEN ACCESS

Conference Abstract

The Forgotten Variable: Effects of Sample Preparation and Storage on Geochemistry of Invertebrate Skeletal Carbonate

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Received: 30 Apr 2018 | Published: 13 Jun 2018

Citation: Smith A, Key, Jr M, Loxton J, Righi A, Forrester J, Buttler C (2018) The Forgotten Variable: Effects of Sample Preparation and Storage on Geochemistry of Invertebrate Skeletal Carbonate. Biodiversity Information Science and Standards 2: e26288. https://doi.org/10.3897/biss.2.26288

Abstract

Standard sample preparation often includes cleaning, bleaching, preservation and storage techniques that may affect temperate invertebrate skeletal carbonate composition and integrity. Here we report on a series of interlinked studies and their key results.

Rinsing with tap or deionised water has little detectable effect on sample composition and integrity. Bleaching with sodium hypochlorite, especially at low concentrations and for short times, results in no change in mineralogy or stable isotopes. High concentrations of bleach, and oxidation using H_2O_2, result in sample dissolution and the leaching of Mg from high-Mg samples. H_2O_2 has a significant effect on $\partial^{18}O$ stable isotope concentration. Chemical removal of organic material is often not necessary.

Ultrasonication of samples results in loss of Mg and skeletal material generally, especially from high-Mg specimens. The combination of ultrasound with bleaching (a common shortcut) is even worse. Roasting of specimens to remove organic carbon causes dramatic changes in composition and cannot be recommended.

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New studies on the effect of storage in various preservatives and conditions are underway. In order to examine longer-term effects of storage, we have been mining museum collections. This collecting activity is ongoing and we would be glad to hear about material we have missed.

Sample preparation and storage can have considerable effect on subsequent chemical investigations, and must form part of research planning, collection management, and sample labelling.

Keywords

preservative, cleaning, treatment, stable isotopes, skeletal carbonate, calcein

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